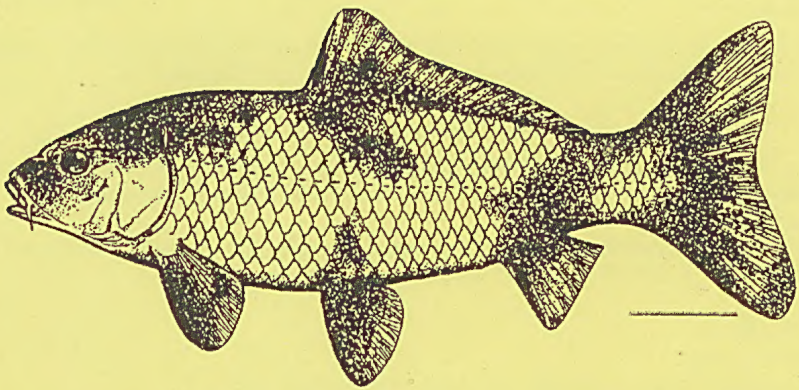
ASL

Australian Society
for Limnology Inc.



Carp (Koi strain) *Cyprinus carpio* L.

NEWSLETTER

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AUSTRALIAN SOCIETY FOR LIMNOLOGY INC.

The Australian Society for Limnology (ASL) is an Australian-based scientific society whose focus is the study and management of inland waters. The ASL was established in 1961, and has a current membership of over 650 researchers, managers, engineers, teachers and tertiary level students from all states and territories. Members have a strong professional interest in inland aquatic issues, including the maintenance of biodiversity, the maintenance and/or restoration of water quality, and the wise use of aquatic resources. The Society also has a strong interest in fostering the scientific and intellectual development of tertiary students.

The Society includes members working in government agencies, tertiary institutions and many industries related to aquatic resources. Through their daily activities, members have contact with local communities and are in a sound position to interpret and advise on inland water issues. The Society has a substantial knowledge base, and has assumed a responsibility to ensure that this is available to those who manage inland waters.

Accordingly, the charter of the ASL is to further our understanding of Australia's inland waters and to promote their wise use and sustainable management. In this manner we will contribute to the continued existence of this valued resource and the maintenance and enhancement of the quality of life for all Australians.

The ASL regularly produces a newsletter with notes on limnological activities, articles of interest, book reviews and announcements of upcoming events likely to be of interest to Members.

EXECUTIVE OFFICERS 1999-2000

President
Dr Pierre Horwitz
Centre for Ecosystem Management, Edith Cowan University, Joondalup, WA 6027.
Ph: 08-9400 5558, Fax 08-9400 5717 Email: p.horwitz@cowan.edu.au;

Vice-President
Dr Jane Chambers
Environmental Science, Murdoch University, Murdoch WA 6150
Ph: 08-9360 2739 Fax: 08-9310 4997 Email: chambers@essun1.murdoch.edu.au

Immediate Past President
Dr Max Finlayson
ERISS, Locked Bag 2, Jabiru, NT 0886
Ph: 08-8979 9756 Fax: 08-8979 2149 Email: maxf@eriss.erin.gov.au

Secretary
Dr Richard Marchant
Museum of Victoria, 71 Victoria Cresent, Abbotsford, VIC 3067.
Ph: 03-9284 0218. Fax 03-9416 0475. Email: rmarch@mov.vic.gov.au.

Treasurer/Membership Officer
Mrs Margaret Hart
22 Netherby Avenue, Wheelers Hill, VIC, 3150.
Ph: 03-9545 3549. Fax: 03-9545 3549 Email m.hart@sci.monash.edu.au

Membership Information and a list of the Regional Executive Officers can be found at the back of this Newsletter

Cover illustration by Keith Breheny, NSW Fisheries, Narrandera Fisheries Centre

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All articles should be forwarded, if possible, as unformatted text on a disk or via email.

ASL Home Page

http://www.asl.org.au/

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EDITORIAL

Yes that is a carp of the front cover, dreaded scourge of freshwater in Australia. The picture is in part to draw attention to the new draft ASL Carp Policy guidelines, in part to celebrate my new position with NSW Fisheries and partly because I can't find any other decent pictures. There are lots of photos out there (Thankyou to all who have sent photos in) but they do not reproduce well in the format of this newsletter (i.e. photocopied and shrunk). Talking of photos, there are some in this issue from an article sent in by Prof Chellappa et al., from Brazil, concerning algal blooms and fish deaths.

This issue sees the last word from our outgoing Prez, Pierre Horwitz. Thanks Pierre for your great efforts over the last two years. The same goes for the members of the executive who will be giving up their duties and handing the reins over to someone else. And for those who are hanging in there for the long term ... keep up the good work. A call for nominations for the ASL Executive is included in this issue and has also be published on the web page. Our Prez has also included in this issue options for changes to the Executive structure and function. These will be discussed at the Congress in Darwin.

We hear from our friendly and unconservative voice from the free market. I am wondering how will this man fair under the GST. Will he survive as a small consultant, end up back in the public service or get swallowed by a larger company. Tim!, look out for AWT or SKM or GHD or SMEC or WSL, an acronym is looking for you.

Unfortunately, I won't be able contend for the door prize this year as I can't make it to the conference. Anyway, to those who are going -have a good conference and pat a crocodile for me.

PRESIDENT'S REPORT

My last President's Report! I have been honoured to serve in this role for the last two years . more than that, I have been lucky to have worked with a wonderful executive, in the main committed, innovative, supportive, productive and enthusiastic. I think we have had a successful two years - new policy documents, submissions to government processes, an active Policy Standing Committee, awarding of the new ASL Medal, and small financial contributions to national or regional limnological initiatives.

Our flagship congresses included last year a joint congress with our New Zealand cousins, and this year's congress in Darwin has two special forums (Australian Wetland Forum and Snowy River Forum). State Chapters have been active (particularly in Victoria, and more recently in NSW and Tasmania). We have managed a healthy debate on the name and thereby the identity of the Society, and conducted an informal ballot as part of this process. The newsletter continues to colour our shelves and our lives every quarter, our website is easily remembered (www.asl.org.au), expands our activities into new areas and serves as a wonderful resource base, and the listserver helps us to communicate more frequently on limnological matters (thanks to Ivor Growns, the newsletter editor, and Simon Josey, the website manager!).

For the first time (I think), the entire executive has been re-elected for a second term, thereby holding position for two years. This has maintained a continuity, and allowed each of us to contribute to the running of ASL at different times. Over this period we have had several discussions on how to improve the Executive's contribution in the light of changing circumstances (electronic communication being one of them). To ensure that these discussions are not the subject of corporate memory loss, I have prepared (see below) a shortish paper on the structure and function of the ASL's executive. Hopefully the issues and the preferred option will be considered by the new executive elected in Darwin.

With an increased scope for the Society, and a willing and able (and large) core group of people who remain actively involved, I'm sure the ASL will continue to be Australia's foremost scientific society representing, and providing stewardship for, Australian inland waters.

I wish the in-coming executive all the best.

Pierre Horwitz
President

ASL's EXECUTIVE - STRUCTURE AND FUNCTION REVISITED

In the light of revisions to the Australian Society for Limnology's Charter and strategic directions initiative (see the Futures Document), this paper examines briefly the structure and function of the executive and its roles in the Society.

THE EXECUTIVE AND THE CONSTITUTION

ASL's constitution gives the executive authority over and responsibility for the dealings of the society. Other than that it is largely silent on the nature of the executive, what roles it might take and so on. The constitution gives us an executive formed by:

1. President
2. Vice-President
3. Immediate Past President
4. Secretary
5. Treasurer/Membership officer,

and 'committee' membership numbering no less than five and no more than eight.

In reality, most executives have had representatives elected from each of the states/territories WA, SA, VIC, NSW, QLD, TAS, NT, and ACT. The Editor of the Newsletter has also been represented on the Executive, although it may not have been made explicit whether that representative was filling one of the eight positions or not.

THE CURRENT SITUATION AND THE CASE FOR A RE-EVALUATION OF THE EXECUTIVE

The current model used by the Society aims for a "low key" executive. The principal duties of running the Society are shared between the Treasurer/membership officer, Secretary, the President and the newsletter editor. This sharing of duties amongst only a small group of the executive places a relatively large burden on 1-4 individuals, and can make delegation difficult, limiting the ability of the Society to respond to any good ideas (i.e. policy or other initiatives), should they arise.

The roles of members of the executive are rarely, if ever, made explicit. State or Territory executive members have contributed to teleconferences and other meetings, and by gathering 'gossip' from their region. They have done this with varying degrees of dedication and expertise. In the past there have been general misunderstandings in the Society that these representative positions involve little work, and might even look good on a CV at some stage in the future. Of course, over the years there have been instances where executive members have been elected but have neither contributed to the running of ASL, nor been accountable to their geographic constituency nor the ASL in general. In other instances we have seen equal representation for a state or territory with geographically widespread membership, or low membership numbers,.compared to state's or territories with centrally-located and large membership (so that balanced geographical representation is unbalanced in terms of proportionate membership).

The Society is changing with:

- increased membership,
- increased geographic spread of membership,
- increasing angst amongst a section of the membership for the Society to become involved in matters of public interest with respect to inland waters,
- increasing competition from, and cooperation between, other scientific societies and active groups, and
- changing technological mechanisms for communication.

Recently the Society has developed its own charter and strategy (the Futures Document) and made regular, minor adjustments in partial response to these challenges. Such responses have included to informally extend the executive to a two year term, and to appoint a website/listserver manager.

In addition:
- changing mechanisms to receive membership applications and payments,
- changes to registrations and payments for congress attendance,
- the publication of the newsletter on the website as well as in print,
- the need to manage the changes required to the distribution of the newsletter, and
- a perceived need to solicit for new membership and promote ASL,

all mitigate for a re-evaluation of key positions on the executive.

It seems appropriate now to address in more detail the issue of executive structure and function, to see whether any other adjustments are necessary or desirable.
Key functional roles required by the Society include:
- treasurer
- secretary
- congress organiser(s)
- policy coordination
- submissions coordination
- media liaison
- liaison with membership and membership officer
- awards coordinator
- promotional coordinator
- publications manager
- website manager
- newsletter editor
- listserver manager

OPTIONS FOR EXECUTIVE STRUCTURE AND FUNCTION

1. No change - continue to elect state or territory representatives to fill 5-8 vacancies, keep treasurer/membership officer together, keep newsletter editor position as separate to all other committee members.
2. Create a membership officer position on the executive
3. Separate treasurer and membership officer (and make another exec. member the membership officer)
4. Create a 'listserver/website' manager position on the executive, and formalise the newsletter editor's position on the executive,
5. Ask website/listserver manager to participate on the executive as an observer
6. Elect members to fill 5-8 vacancies on the basis of key functional roles, ie. those listed above, NOT on the basis of regional representation
7. Elect members to fill 5-8 vacancies based on regional representation but ask all elected executive members to choose at least one area in which they will perform as well as their regional representation.

Note that options 2, 3 and 4 may require changes to the Constitution to expand the numbers of committee members.
Each of these options will be evaluated by the current executive. Irrespective of the preferred option, the current executive has endorsed the following duty statement for ASL Executive Members.

PROPOSED DUTY STATEMENT FOR ASL EXECUTIVE MEMBER

To be eligible for the executive, a person must:

• be a financial member of ASL

• be an enthusiastic advocate of the Society and the role it can play in the understanding and management of Australian inland waters

• be willing to represent the Society in a nominated regional/geographical area

• be willing to contribute to the running of the Society in at least one the following areas:
- liaison with congress organisers
- policy coordination
- submissions coordination
- media
- liaison with membership and membership officer
- awards
- promotional matters
- publications
- website/newsletter/listserver

• be prepared to regularly dedicate a proportion of her/his time to the affairs of the Society.

The ASL also encourages enthusiastic postgraduates and early career limnologists to become actively involved in the Society's affairs.

KIJOUNOKUURON, AKKOUZOUGON, ZOKUWA, GOSHIPPU AND TORIZATA

ENVIRONMENTAL FLOW REQUIREMENTS FOR AUSTRALIAN ARID ZONE RIVERS (ARIDFLO)

The first of four field trips in the ARIDFLO project has just been completed. The trip took us through the flooded gibber and dunefields of the Lake Eyre Basin, to sites along the Neales River west of Lake Eyre, Goyder's lagoon on the lower Diamantina River, Coongie Lakes on lower Cooper Creek, and the Thompson River on the upper Cooper - a vehicular distance of about 7000 km. The aerial survey component of the trip covered an even larger area, including much of south-western Queensland.

The aim of this grand enterprise is to model biological responses to patterns of flow in the major rivers of the arid Lake Eyre Basin, using a combination of scientific and landholder knowledge. The project will test the findings of the 1998 DRY/WET project, which modelled responses of fish, macroinvertebrates and zooplankton to patterns of flow in the Coongie Lakes system on the lower Cooper. ARIDFLO will also however develop a methodology for modelling flow in ungauged or poorly gauged arid zone rivers, extend the spatial and temporal scales of the DRY/WET model, and extend the model to include responses of littoral and riparian vegetation and waterbirds.

The project is funded by the Environmental Flows Initiative of Environment Australia, and managed by the SA Department of Water Resources. In various capacities it involves 15 scientists from 11 institutions: ANU, Charles Sturt University, CSIRO, the University of Newcastle, the University of Canberra, Melbourne University, MDFRC, Griffith University, Adelaide University., SA Department of Water Resources and the Queensland Department of Natural Resources (QDNR) and Queensland Environmental Protection Agency (QEPA). The scientific work in the project is coordinated through Environmental Biology at Adelaide University. Sampling in the upper Cooper and upper Diamantina is being done by a combined team from QDNR and QEPA. For field work the project also relies on the selfless efforts of a team of volunteers, and the goodwill and local knowledge of landowners.

Contact with landholders is an important part of the project. Gaining permission to work on properties is a critical first step in any fieldwork program with sites on leasehold or freehold land. Landholders, as was shown on this first trip, have a wealth of knowledge about their properties. We gained valuable advice about the flooding frequency and flood duration of many waterholes and the best way to find them – not always an easy task in much of the terrain. Also, landholders can offer valuable observations about the biological responses to floods-hardly surprising in a landscape where terrestrial as well as aquatic ecosystems are driven by the 'boom & bust' climate. The project hopes to collect as much knowledge from landholders as possible to incorporate into the project's outputs.

The first field trip tested the sampling design and the resourcefulness of the project team to their limits. From the point of view of the information content of the project the timing was perfect - our first trip was in the field during the largest floods in the basin since 1990. We now know we can follow, over the next two years, the course of these floods and their recession, and so open a

window into biological responses to a wide range of the flow events likely to occur in these systems. Further, because we are looking at such a wide geographic range, and at many waterbodies in each of the three rivers, we will see waterbodies in every stage of inundation, from full flood to drying.

There are substantial logistic difficulties however in attempting work at this scale, and in such remote environments. We ran head-on into them on this trip. The sheer scale of flooding, coupled with heavy local rain, made vehicle travel extremely difficult. We lost count of how often we got bogged or had to backtrack around swamps, creeks and flooded tracks. We got to our three rivers, five river reaches and to 24 waterbodies, but lost precious sampling time, and some of our grand schemes for replication had to be abandoned. The Queensland team (QDNR and QEPA) managed to sample the upper Cooper, but were turned back by repeated flooding and rain from most of their sites on the upper Diamantina. But we still got invaluable information - juvenile fish pouring with new floodwaters onto the floodplain, and in early flooded reaches (where waters had already receded), teeming larval fish, striking changes in composition of fish assemblages, huge waterbird breeding colonies already established, macroinvertebrates and zooplankters from rarely flooded pans.

The field team varied from 14 to 17 people - from diverse backgrounds and many who hadn't met before. We worked under difficult conditions, with daily flies, nightly plagues of mosquitoes, days spent jolting over tracks, packing and unpacking the camp, some spectacular thunderstorms and heavy rain. Despite all our precautions, two people contracted Ross River fever. Yet we got on wonderfully well, saw amazing sights - grassy meadows in the gibber, flowers, butterflies and swimming snakes, inland dotterels herding chicks, gullbilled terns feeding on locusts, fish pouring across the Birdsville Track - the landscape was transforming itself before our eyes, and rewarding us for all our trouble. Even the volunteers said they would go again, mosquitoes or not.

Jim Puckridge
Department of Environmental Biology
University of Adelaide

NARRANDERA FISHERIES CENTRE

News from the NFC ceased when **Peter Gehrke** abandoned us for the coast. This update will not fill the gap but may serve to remind the world that NFC is alive and busy.

Craig Schiller is burning the 3am oil with data analyses and report writing on the projects due for completion. His secondary function at NFC has evolved as a scheduler for the activity of the electrofishing fleet. AC/DC and Pole Volt are booked out till 2005 (pending maintenance and review).

The Mc-team of **Matt McIntosh** and **David McGill** are well into the final phases of the Methods for Carp Control project. Seine netting in billabongs in deep winter has them pondering the benefits of summer sampling. **Mick Rodgers** and **Keith Breheny** are translating data sheet hieroglyphics and dismantling their cutting-edge prototype equipment used in the Downstream Transport of Larval and Juvenile Fishes project. **Craig** eagerly awaits news of verification of idents and otolith age data. The carp and the larval projects are currently due for completion and have generated keen interest.

Ian Wooden has temporarily abandoned ship and is enjoying his jaunt with Eastern cod at Coff's Harbour. We suspect he misses the cosmopolitan vitality of the 'Town of Trees' but keeps informing us of the benefits of an office by the sea. The trout cod project suffers in his absence.

Welcome to **Phil Boulton**, an 'ex-pat Aussie Brit' who joins us from the UK Environment Agency and brings with him considerable experience of spring carp mortality syndrome (SCMS). Unfortunately the carp here seem immune to this (and any other) malady. **Phil**'s spare time is spent frantically sampling the native species from surrounding waterways.

Lee Baumgartner is working on the Innovative Fishways project, decoding the encrypted mysteries of Deelder and Denil fishways. For light relief he joins our GP Technician, **Nick Whiterod** (Honours student from University of Adelaide) in weekend football matches with the local rules team. They both eagerly await an opportunity to celebrate a win.

The Station leader, **Ken Bock** and team (**Lyn Smith, Les Rava, Peter McLean** and **Dexter Briggs**) are dealing with the major structural changes with commendable resolve. At the same time they somehow manage to cope with the idiosyncrasies of the research team and the feverish activity at the hatchery. **Peter Angel** (DFO) continues to 'keep the b....s honest' in his handsome new boat and rig.

Steve Thurstan and **Matt Allanson** keep the good news flowing from the hatchery. The native fish breeding program has seen some major developments thanks to increased funding from the Freshwater Anglers Licence fund. A temporary technician position, was created, extra ponds and tanks installed, and a number of other improvements funded. The season ended with the third successive year of record production with 74 000 Trout Cod, 343 000 Murray Cod, 1 284 000 Golden Perch and 319 000 Silver Perch.

All at NFC eagerly await the outcome of proposed recruitment of a permanent hatchery Technician, a Conservation Manager and news of the long-term future for the Centre.

Keith Breheny

COOPERATIVE RESEARCH CENTRE FOR FRESHWATER ECOLOGY

Congratulations to **Ben Gawne** and his team, who have won a project from the MDBC to develop an experimental design and monitor a weir drawdown trial to examine ecological benefits. In addition to CRCFE staff (**Glenn Wilson, Rod Oliver, Darren Baldwin, Keith Walker** and **David Williams**), the team includes **David Harriss** and **Michael Williams** (DLWC), **Paul Lloyd** (Murray Wetlands Working Group) and **Robert Gillespie** (Gillespie Economics).

Well done to **John Whittington** and his team, who reviewed the ecological sustainability of the Cap on diversions in the Murray Darling Basin. **Terry Hillman, Ben Gawne, Martin Thoms, Keith Walker** and **Peter Cottingham** also contributed to the report, which was well received by the Ministerial Council. **Peter Cullen** provided expert advice to the team.

Sabine Schreiber and **Peter Cottingham** are currently collaborating with the CRC for Catchment Hydrology on a stream rehabilitation project for the MDBC. The first stage of the project is to scope out the rehabilitation objectives and develop an appropriate methodology (to be completed by the end of August). **Gerry Quinn, Sam Lake, John Koehn/Simon Nicol** and **Terry Hillman** will provide expert advice along the way. The second stage of the project will be to implement the project designed in stage 1 (assuming the MDBC is happy with stage 1), and is likely to run for a number of years.

Ian Lawrence is managing a project that reviews effluent standards for STP's across the ACT. ACTEW intends to use treated wastewater for irrigation (golf courses etc.). The disposal of treated effluent to steams is likely when wastewater supply exceeds irrigation demand (e.g. in winter). This project examines the effluent standards required to protect the aquatic ecosystems in the vicinity of, and downstream from, the local STP should effluent discharge occur. **Ian** will be assisted by **Richard Norris, Bill Maher** and **Peter Cottingham**. **Ian** is also undertaking two short reviews: Stormwater Management Practices for Newcastle City Council; and Nutrient Export Model for NSW EPA.

Peter Cottingham and **Terry Hillman** are reviewing the monitoring requirements for the Woronora River for the Sydney Catchment Authority, supported by **Gerry Quinn, John Harris, Richard Norris, Martin Thoms** and **Judy Frankenberg**. The SCA is currently involved, along with the NSW Healthy Rivers Commission, with identifying environmental flow targets for the river below Woronora Dam. **Terry Hillman, Martin Thoms** and **John Koehn** are helping DLWC and **Peter Millington** assess the environmental flow requirements for the Murrumbidgee River. The project commenced in early April.

CRCFE 1st Year Pastoral Visit

The First Year visit to the CRCFE was held at the University of Canberra on 2 March by a visiting panel consisting of:

Chair Mr Graeme Kelleher
CRC Visitor Dr Barbara Bowles
Secretariat Support Mr Vic Lawrentin

The CRC was represented by the Chairman of the Board (John Langford), CEO (Peter Cullen), Business Manager (David Rischbieth), Director of Research (Barry Hart), Director of Regional Laboratories (Terry Hillman), Chief Ecologist (Sam Lake) and Executive Officer (Di Flett).

Overall, the CRCFE received a very favourable report. The report stated that the CRC had "no significant weaknesses" and "The CRCFE is applying directly the experience and knowledge gained by its predecessor, to the extent that it is already clearly focusing on and achieving all the evaluation criteria". Organised by the CRC Secretariat, the visit aims to check on our 'start-up' and provide guidance and advice where necessary. The glowing report will stand us in good stead for the first of our CRC reviews, expected to occur between years 2 and 3.

Congratulations

Congratulations to **Daryl Nielsen** (Doctor of Philosophy) who graduated at the Charles Sturt University Graduation Ceremony on 28 April. Daryl's billabong research can be viewed at http://wwwdb.csu.edu.au/division/marketing/ne/newsm178.htm

Congratulations to Dr **Fran Sheldon** (Department of Environmental Biology, University of Adelaide) on the birth of her daughter, Sophie, born on 8 May and to Dr **Jennifer Davis** who had a baby boy, Tom, on 24 November.

Dr **Keith Walker**, Associate Professor at the Adelaide University, has been awarded the "Unsung Hero of South Australian Science" by the Australian Science Communicators (ASC) - the award being a highlight of National Science Week. For more than 20 years, **Keith** has been actively involved with environmental issues in the Murray Darling Basin. "**Keith Walker**'s work has been influential in the academic sphere and he has been a good ambassador for the River Murray to the public", said Mr **Robert Perrin**, the regional coordinator of the ASC in South Australia.

Peter Cullen has been elected a member of the International Ecology Institute (ECI) in the field of limnetic ecology. The Institute, based in Germany, was founded by Professor **Otto Kinne** in 1984. It seeks to promote exchange of information between the various fields of ecology and to promote environmental research.

Rhonda Sinclair

Aquatic Ecology Lab - Monash University:

Well the big news from the lab is that one of the longest running members of the aquatic ecology group is leaving, potentially for all time! **Sabine Schreiber** has been in the department for 19 years (doing two higher degrees as well as research grant work), most of that with **Sam Lake**, and in more recent times (the past 10years – that's recent on her time scale!) with **Gerry Quinn**. Talk about endurance!!. Those of us being left behind are incredibly sad to see her go; we will miss her enthusiasm for all things in freshwater ecology, her problem solving skills, and her effortless interaction with students and academics. She if off to Germany with the family for four months (part of the trip is working – rest is a holiday) and may not come back to Monash. We all wish her well!

Michael Reid has been touring round the countryside doing a number of things including trips to Barmah/Millewa Forest, and Adelaide for the last algal taxonomy extravaganza. Michael will be leaving the lab at the end of August and returning to his old stomping ground in Dept Geography and Environmental Sciences doing groundbreaking work on the palaeolimnology of the Murray River. **Rhonda Butcher** has been busy with her PhD, except, that is, when she has been doing lots of little consulting jobs, demonstrating, and organising her upcoming travels (travails?) in Canada (Quebec does look lovely in summer!). In other words the PhD hasn't had a look in at all in recent times. **Alena Glaister** is present but absent from the lab, she has finished a large amount of microscope work and is now ensconced in her office playing with the data.

Other departures are **Paulo Lay** who is heading to NRE Waterways, BUT not before he finishes ALL the remaining invertebrate samples from the Monitoring Environmental Water Allocations program that Michael and co. have been working on.

New students to the lab include **Adrian Kellaher** (with Gerry and **Paul Humphries**) working on the ecology of three species of carp gudgeon in the Shepparton region. **Claudette Keller** is beginning her PhD with Gerry and Sam on biodiversity regulation in temporary wetlands. **Andrea Ballinger** is doing her PhD with Sam and Ralph McNally on effects of flooding on the diversity of (predominantly terrestrial) invertebrates in floodplain woody debris. The newish round of honours students include **Ruben Keller** – working on the impacts of the oriental weatherloach on prey density; and **Sarina Loo** – working on bricks (yes they are still here and still being used!) in Lake Purrumbete.

Gerry is frequently found loitering at the world renowned and salubrious meeting rooms of the QANTAS members club (doing CRCFE things he claims). As for **Sam**, his second postcard from Spain arrived today. and THAT doesn't need any comment!

Michael Reid and **Rhonda Butcher**

ERISS –National Centre for Tropical Wetland Research

The NCTWR is now established with projects from ***eriss***, JCU and UWA being combined to develop and initial research program. Facilities are also available at ***eriss***, JCU, NTU and UWA for conducting NCTWR projects. Please contact enquiries@nctwr.erin.gov.au if you are interested in collaborative projects etc. Our brief is TROPICAL WETLANDS.

Current activities include supporting ASL 2000 and the Australian Wetland Forum in July 2000, and the development with Wetlands International-Asia/Pacific of an Asian Wetland Inventory using protocols derived from those developed for Australia and in line with the Ramsar recommendations on inventory. This has involved a trip to Japan to obtain support from the National Institute for Environmental Studies in Tsukuba.

There is also considerable further development of technical processes for wetland inventory and assessment via the Ramsar scientific and technical panel which meets again in late June. Max Finlayson will attend and lead the development of globally recommended standards for inventory (including classification!) as well as investigate linking current wetland risk assessment processes with processes used for vulnerability assessments of wetlands to climate change and sea level rise. The latter will be based on various projects run by ***eriss*** in the last few years.

Inventory & Ecology activities

Current NCTWR projects describing the values and benefits derived from tropical wetlands include a survey and management planning for wetlands on Aboriginal lands in the NT, the management of fish habitat values in the Burdekin River delta and a classification for water quality management in tropical wetlands. Assessments are also being undertaken in the Solomon Islands on the human impacts of wetlands and in eastern China on threats to wetlands arising from climate change. Together with the ongoing identification and monitoring of change in wetland inundation and vegetation patterns in the Alligator Rivers Region, an inventory of wetlands in the Daly River basin is also being undertaken as part of a major environmental flows initiative currently underway in the NT.

Recently completed projects include a review of environmental management and the impacts of mining in Tropical Oceania and, in the near future, ***eriss*** is hoping to work collaboratively on a project designed to make a quantitative assessment of the World Heritage values and ecological character of tropical Ramsar sites.

Risk Assessment and Restoration activities

A risk assessment of the impact of cane toads on wetlands of the NT is currently being undertaken by ***eriss*** staff, with particular focus on identifying key vulnerable species and habitats that could form the basis of monitoring programs in Kakadu National Park. Cane toads have spread as far as Mataranka on the Stuart Hwy and are increasing their range at an average 30 km per year.

We are currently testing the freshwater alga *Chlorella* sp using Magela Creek water and uranyl sulphate. The results to date indicate a sensitive response, with a response in growth rate detected below 20ppb U. Results of this research will be made available for the ANZECC water quality guideline revision.

Anna Smith from RMIT has joined our group until September 2000. The title of her Honours project is 'Application of the *Moinodaphnia macleayi* feeding rate bioassay as a rapid screening test for complex mixtures' and is a continuation of the work done by previous honours student Sonia Orchard.

Jabiluka mine assessments

We are continuing our efforts to provide information for the assessment being undertaken in relation to the natural heritage values of Kakadu National Park, being conducted via the World Heritage Bureau. This will result in further assessments at a landscape scale and further input to an ecological risk assessment. We will also present a number of papers on our assessment work in relation to mining during ASL 2000 (see separate note).

Wetland training and study tours

Over the past few months we have participated in two wetland training courses. In the first we were contracted to assist the Northern Territory University to deliver a course under the Asia-Pacific wetland managers training program that is funded by Environment Australia. The Wetland Assessment and Management course was held in Darwin and Jabiru on 18–24 March and jointly coordinated by Michael Douglas (NTU) and Abbie Spiers (***eriss***). There were 9 wetland managers from Asia and the Pacific regions and an observer from Environment Australia participating in the course activities, which included field trips, lectures and guest speakers on various tropical wetland issues.

The second training activity we conducted recently was a study tour of northern Australia by six wetland managers from the Mekong Delta, Viet Nam, on 14–21 April. The tour was funded by the NTU's Asia Pacific Wetland Managers Training Program and coordinated by Caroline Camilleri and Abbie Spiers from ***eriss***. Care International funded one of the visitors. Parks Australia North staff and various wetland experts from the Top End of the NT were involved in presenting and exchanging information with our Viet Namese visitors. After a visit to Yellow Waters, the visitors were particularly impressed with the vast scale of our floodplains and *Melaleuca* forests, in comparison to the remnant wetlands of Tram Chim National Park and U Minh Thuong Reserve in the Mekong Delta.

With funding from the same program we were able to send Michael Storrs to Tram Chim National Park in Viet Nam for a few weeks to spend time with local staff to develop a weed management strategy – Mimosa being a main protagonist!

From

Abbie Spiers

FRESHWATER BIOLOGICAL MONITORING GROUP - QUEENSLAND DEPARTMENT OF NATURAL RESOURCES

It has been some time now since our last contribution and we have had some changes in personnel. **Sandra Grinter** has left Rocklea for a job in Toowoomba but is still within DNR. **Bernie Cockayne,** formerly from MDFRC, Albury, has been drafted in to replace **Sandra** and has adopted several vital roles within our group. He is now our librarian, he has been distributing specimens to various taxonomic experts for species level identification, and last but most importantly he is running our football tipping competition (in which I should add I am running a distant last).

Neil Tripodi has also joined us from Sydney (formerly UNE and ERISS) to progress our FNARH6 sample identification while **Jon Marshall** has been on leave writing up his PhD thesis. Upon his return Jon has been seconded to work on a project defining links between ecological condition of streams and their flow characteristics. This work is associated with Queensland's Water Allocation Management Planning (WAMP). **Peter Negus** has taken a break from his PhD at Griffith University for the past few months to assist with this project.

Chris Thomson attended the Taxonomic Workshop in Albury earlier this year and is currently preparing a promotional pamphlet and poster extolling our work. **Satish Choy** has been working on a 10 year research plan for the department as well as his usual heavy load of meetings, technical advisory panels etc, so **Diane Conrick** has relieved him of some of the day to day management of our group. **Diane** has also completed a report defining the current condition of the Logan River based on bugs for the Logan WAMP.

WAMP condition reports have also kept **Chris Marshall** very busy. He has completed one for the Burnett River and is nearing completion of the Pioneer River report. **Chris** has applied some innovative approaches that we have developed to these assessments and they show great promise. **Chris** has also completed an assessment of the impacts of Walla Weir and a baseline study for the future Mary River – Tinana Creek water transfer development. **Glenn McGregor** has completed the Blue Green Algae component of this study.

It is quite fortunate that **Glenn** does not have to swim to collect his BG algae samples. Late last year the 88 m long flume used to calibrate flow meters was converted into an Olympic standard swimming facility for the first annual Rocklea Flume Challenge. **Glenn, Peter** and I swam for the honour of Biological Monitoring and I'm afraid to report that **Glenn** finished (but only just) last with a time of 2:56. And that was despite our cheer squad waving a banner reading "Swim like a crayfish being chased by a big scary eel!".The winner was from the instrumentation section with 1:08. I have begun a rigorous training programme to prepare for this year's race.

In his working life **Glenn** has lost one assistant and gained another. **Ricci Churchill** has left for a job in the enforcement section of the EPA and **Michelle Jenkins** has started as her replacement one day per week. **Michelle** is quickly learning BG algae identification skills to complement her other botanical knowledge. She currently works the remaining four days each week at the Qld Herbarium.

Glenn is also involved in organising an international conference and a workshop (ICTC5 and 3rd Australian Algal Workshop), and presented a paper at the HAB2000 conference in Hobart earlier

this year. **Satish**, **Sandra** and **Peter** attended and presented papers at ASL in NZ and we are sending a contingent to Darwin.

Well that's it from sunny Rocklea. We are mostly lab-bound at present but at least we are on target for all our FNARH milestones.

Until next time…

Correspondent - **Jon Marshall**

DLWC -NSW

Lots and lots of things are happening in the Riverine Environment Unit in the Central West Region of the DLWC. **Greg Raisin** (located in Orange) continues to head the growing group of enthusiastic staff who are scattered across the Region. E-mails, faxes and voice mails go back and forth at a scary speed!

In Dubbo you can have too much of a good thing!.**Chris Burton, Sean Grimes** and **Renée Kidson** have been busy with fieldwork in the Macquarie Marshes this autumn. The Integrated Monitoring of Environmental Flows (IMEF) project involves sampling in the Marshes before and after an environmental flow. The problem is, this autumn there have been multiple environmental flows that have acted as 'triggers' for sampling.

Chris, Sean and **Renée** have been fortunate to witness a rare event: the physical connection of wetland 'lagoons' to the Macquarie River channel courtesy of high flows. This may only occur for a few hours once every few years, and is a dramatic 'catastrophic' event for the local ecology. Preliminary results indicate this system is responding more strongly to moisture conditions than seasonal influences at this time. Meanwhile, **El Nino** is being watched very closely, knowing full well what follows such a period of abundant moisture in this part of the World.

A second IMEF project being conducted by **Chris** and **Sean** is linking the environmental flows to biofilm establishment and succession. **Chris** is also finalising the Water Quality Action Plan which is focussed on suspended solids, turbidity, salinity and temperature in the Macquarie River below Burrendong Dam.

Debbie Love, also from Dubbo, has been caught up in Water Reform activities. **Debbie** is currently responsible for coordinating an inter agency group which is pulling together information for the Unregulated River Management Committees which has included report cards for Stressed River subcatchments. **Chris Knight** has the enviable task in summer (but not so enviable in winter) of spending the bulk of his time conducting sampling for the many water quality projects being conducted in the Macquarie catchment.

In Forbes, REU staff are busy monitoring responses to Lachlan River flows and changes in water quality conditions. **Lisa Thurtell** is working on a component of IMEF that involves monitoring algal populations in Lower Lachlan weir pools. This study focuses on the effects of flow volume and source, and water quality variables on algal populations in four weir pools. **Lisa** and **Alastair McKenzie-McHarg** are also looking at the effects of two off-river storages, Lake Cargelligo and Lake Brewster, on the water quality of the Lower Lachlan River.

Marita Woods has taken up the position of the new Aquatic Ecologist in Forbes. **Marita** will be involved in the Pressure-Biota-Habitat (PBH) project which is a method for rapid assessment of unregulated stream quality using hydrology, water quality, biology and geomorphology. **Marita** will also be involved in developing a Water Quality Action Plan (WQAP) for the Lachlan River involving monitoring of in-stream suspended solids, turbidity, salt loads, nutrients and temperature depression below Wyangala Dam.

Patrick Driver, Suzanne Unthank and **Peter Lloyd Jones** are working on various aspects of the IMEF project which looks at the response of 12 wetlands to environmental flow events. **Marcus Finn** got sick of identifying most of the wetland bugs collected as part of the project and left to do a PhD with Andrew Boulton at UNE, Armidale.

Patrick and **John Jones** (of Orange) are coordinating a 3 year study of the groundwater-surface water interactions within the Great Cumbung Swamp with part of the work being outsources to experts in modelling groundwater and surface flow. Another wetlands project in the Lachlan involves the use of GIS imagery and ground-truthing to track commence to flow and spatial inundation of the floodplain wetlands.

Michael Longhurst has initiated a Community Monitoring Program in conjunction with the Lachlan River Management Committee and has gained interest from a large number of landholders along the river.

The Hydrographic section of **Todd Dennis**, **Peter Ostrowski**, **Adam Wiggins**, **Stiven Marcon**, **Ian Toomer**, **Simon Cruikshank**, **Keith McFadden**, **Andrew Pearce** and **Anthony Easman** are regularly rounded up by **Linda Perkins** to provide masses of hydrographic assistance and installation of real time water quality monitoring systems. Interesting lot that bunch!

Then there is the smaller group in Orange. **Vicki Martin** has been evolving from a water quality officer to something not yet described in the literature. **Vicki** is currently providing planning support to Water Management Committees which includes developing assessment criteria, flow management options and **Vicki** neatly dumped the blue green algal contingency planning **onto Jeff Bradley** who also works on developing and maintaining various water quality data bases and conducting sampling. **John Jones** (previously mentioned) joined the ranks as our hydrological guru and spends many hours glued to his computer working on volumetric conversions, IQQM modelling and restructuring of the Region's hydrographic network. After spending many months in the field, **Tim Baker** is now writing up his work on rapid assessment of river health in the Macquarie, Castlereagh and Bogan catchments. **Tim** has also been trialing a new assessment method which uses aspects of published methods.

by

Vicki Martin

Did you know : this is the son of John Jones, DLWC

SCHOOL OF ECOLOGY & ENVIRONMENT, DEAKIN UNIVERSITY.

The Land and Water Resources Research and Development Corporation has nominated **Paul Bailey** and.**Kimberley James** (Deakin University) for the Prime Minister's Environment Awards.in the category, 'Australia 2000 Environment Award for Outstanding Individual Achievement'. The nomination is for their work over the last 10 years on the impacts of salinity on freshwater biota and management techniques to minimise these impacts, so congratulations to **Kimberley** and **Paul**. If you want to find out what it is all about, and the state of play with salinity issues, read their newly released review: **Bailey**, P.C.E. and **James** K.R. (2000). *Riverine and Wetland Salinity Impacts - Assessment of R & D Needs*. Land and Water Resources Research and Development Corporation, Occasional Paper Series *25/99*. Canberra, LWRRDC. ISBN 0 642 26779 0.

At Warrnambool, things are fairly quiet, with all heads down getting to the end of the semester. A few students recently finished their Honours, including the following freshwater projects: **Shanaugh McKay** 'Ecology and management of the lower Gellibrand River and estuary', **Louise Koroblitsas** 'Ecology and management of Russells Creek, Warrnambool', **Bernadette Bostock** ' A limnological study of Lake Bolac' and **Sascha Gasperini** 'A limnological study of Lake Gillear'.

Dr **Belinda Robson**

AUSTRALIAN WATER QUALITY CENTRE

BOLIVAR SOUTH AUSTRALIA

The Algal Studies and Algal Operations group has been extremely busy over the summer and autumn period with ongoing project work, consultancies and monitoring of cyanobacterial blooms. **Mike Burch**, **Justin Brookes** and **Renate Velzeboer** have been involved in a large destratification project funded by the CRCWQT in Myponga Reservoir, involving intensive monitoring of the performance of installed mixers. Mike, Renate and **Peter Hobson** worked on a consultancy to evaluate an algicide for Agmin Chelates and Renate also visited several small rural water supply dams in Western Australia as part of a consultancy to investigate biological sources of taste and odour. **Peter Baker** and the Biology Operations team of Dean Newman, **Chris Blake**, **Caroline Fazekas**, **Michael Manou**, **Stacey Kovac** and **Gavin Ralston** have been heavily involved in monitoring of a *Microcystis* bloom in the Torrens Lake in February/March. The Easter break for many was interrupted by a toxic cyanobacterial incident on Yorke Peninsula (SA). An unknown toxin produced by the benthic cyanobacterium *Phormidium* resulted in contamination of over 1500 km of water main affecting some 14,000 people over the Easter holidays. Intensive monitoring over the five day holiday break resulted in helicopter flights for some of the team.

The Aquatic Ecology and Biomonitoring sub-unit continues to be busy. The important news on the personal front is the birth of **Isla** to **Shari & Chris Madden.** Their house extensions are not yet completed but **Paul M^{c}Evoy** has finally moved into his new house. Paul has reported on the "Aquatic Worms of South Australia". Funds have been secured from the State Government to sample some sites for MRH in 2000. The 15 AusRivAS reference sites sampled from 1994 to 1999 will be revisited and it is hoped that this list of sites will be lengthened in 2001. Another year of sampling for the Onkaparinga Catchment Water Management Board has started and the 1999 data has been run through the AusRivAS model for the Board. We are currently processing samples for the NSW DLWC identifying wetland samples to species. A new project in the Mawson Lakes development is underway. Another year's data has been added to the Acid Mine Drainage impact story in Dawesley Creek. To summarise we are all very busy.

Peter Schultz

LA TROBE UNI ALBURY-WODONGA CAMPUS CONTRIBUTION FOLLOWS.

Syarifuddin has completed his PhD thesis and handed in at the end of March. His topic was "The role of surface complexity of submerged logs and fish predation in structuring benthic invertebrate communities in Billabongs." **Syarif** returned to Indonesia in January and there were numerous emails flying between Medan, Canterbury (NZ) (**Gerry Closs**) and Wodonga as chapters went back and forth.

Paul McInerney (The effect of an inter-basin transfer on the EPT (Ephemeroptera, Plecoptera and Trichoptera for the uninitiated) and **Paul Ratajczyk** (Mayfly distributions in the Kiewa River) have handed in their honours theses and now are awaiting their final results.

Phil Suter (recently quoted as saying "Mayflies are the most magnificent animals on the planet") (Nuh- Can't beat a crayfish, they have more legs!- ED) has completed a paper on Tasmanian Baetid mayflies and has been working on one on Bungona/Cloeodes with **Melanie Pearson**. Also recent work with **Janelle Collinge** has shown that there is more than one species of Cloeon which is of concern. **Janelle**'s genetic work has enabled two good species from the Albury/Wodonga area and their descriptions are now being prepared.

Tim Curmi is continuing his sampling of the Lachlan River and is now discovering the joys of rain in the arid zone and dirt roads. He has done well so far and avoided being temporarily impeded.

The best news of all from this campus was the presentation of the Degree of Doctor of Science honoris causa by La Trobe University at the graduation ceremony at the Albury/Wodonga campus to one of ASLs own, Dr **Terry Hillman**. Congratulations **Terry**, this is an honour well deserved.

by **Phil (what's that baetid, or other mayfly thingy) Suter**

FASTS

THE NEXT STEP TO THE NEW ECONOMY

Australia's peak council for scientists and technologists today (Tuesday) called for a doubling of the budget of the Australian Research Council budget, as one measure to counter a 13 per cent drop in higher education funding for research over the last four years.

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The recommendation was contained in a response to the Government paper, "Knowledge and Innovation: A policy statement on research and research training".

Professor Sue Serjeantson, President of the Federation of Australian Scientific and Technological Societies (FASTS), said the Paper shows the Government's rhetoric is in place.

"In many ways the Paper is an admirable statement of principle," she said. "But - and there's always a but - the Government has not gone the next step. That step involves increasing the national investment in the higher education sector.

"That's what our international competitors are doing. Australia has to reach for the wallet in its back pocket. "This is clearly a painful process with the Government hell-bent on reducing taxes, but the consequences for the next generation could be extreme.

"The current level of the Aussie dollar is the judgement of the international community on where Australia is going to be ten, twenty, thirty years from now."

Professor Serjeantson said the Minister had done his best to alert Cabinet to the challenges facing the higher education research sector.

"Dr Kemp describes the universities as being 'in a difficult financial position', with higher student to staff ratios and less frequent tutorials. He talks about 'a perception of declining quality.'"

"I'd put it more strongly, but basically he's right," she said. "Now Dr Kemp has to convince his Cabinet colleagues."

She said it is essential the thinking behind this Paper on knowledge and innovation is worked into the outcomes of the Innovation Summit. The issues of national investment in research and research training need a whole-of-Government rather than a piecemeal approach.

Part of the solution would be to increase the salaries attached to ARC.fellowships. These awards were once considered prestigious, but now do not even match the generally low salary levels in Australian research organisations, let alone international levels.

FASTS is also concerned about increased levels of industry funding that research organisations are expected to attract, even for the core activities of teaching and research in universities.

"We recognise that researchers need to interact with industry. But industry has to take responsibility for supporting research of direct benefit to them; and Government has a similar responsibility to invest in basic research that generates national prosperity," she said.

"Science meets Parliament" Day, 2000

I am delighted to announce the dates for "Science meets Parliament" Day.for 2000. The event will be held in Canberra on Tuesday October 31 and Wednesday November 1, and again provides an opportunity for scientists.and technologists to personally put the case for science to their MPs.

Early November will be an excellent time to approach Parliamentarians. It is the beginning of a Budget cycle, and Parliamentarians will be particularly responsive to issues and concerns from their electorates because 2001 is an election year. As a benefit of membership of FASTS,.the event is only open to scientists who are members of Societies or groups affiliated with FASTS.

The Budget to be handed down in May this year is expected to offer few funding initiatives. But the position next year will be different. Not only will the Government be in pre-election mode, but several.initiatives affecting science and technology will be coming to fruition. Recommendations from the Innovation Summit will be flowing through the policy-making channels; and the Chief Scientist's review of Australia's science capability will be complete.

Last year 170 scientists and technologists met 140 Parliamentarians,.and a report of this day has been posted on the FASTS' web site. There have already been significant shifts on four of our five core issues. These.are detailed below.

Both Parliamentarians and scientists clearly enjoyed the event last.year.
The average meeting lasted nearly an hour, double the scheduled 30.minutes.
Parliamentarians wanted to know how science could help both their electorate and the nation, and were generally impressed by the case for investment in Australia's science and research.

This year we are hoping to increase the number of younger scientists at.the event. It may be possible for your Society to sponsor suitable young representatives, or to schedule one of your regular meetings in.Canberra for that week. The Australian Institute for Physics held their Heads.of Departments meeting in Canberra in the same week, enabling their.members to attend SmP Day at a relatively small cost. Details about registration for the event will follow shortly.

Four issues from the 1999 "Science meets Parliament" Day

Issue: Bringing the Boys (and Girls!) Back Home

There are schemes in place to send Australians overseas but not to bringthem back. There are bilateral arrangements with some countries forscientific travel, but these bilateral schemes do not cater for expatriateAustralians.

Response:."I fully support your suggestion for a scheme of fellowships andstipends for expatriate scientists ŠTo encourage further opportunities in this regard I announced at the recent Innovation Summit that I propose tomake up to five million dollars from the Technology Diffusion Program available to fund joint proposals from the business and research community to bring the best researchers and innovators to Australia to pass on.theirknowledge and experience to Australians.".(Minister Nick Minchin to

Issue: HECs Equalisation

Teachers with tertiary qualifications in science, mathematics and computingbegin teaching on the same pay and conditions as all other teachers. Yetthey have a greater HECs burden than teachers from the humanities or those from B.Ed courses which attract the lowest HECs rate.

Response: (From the ALP)."A Federal Labor Government will offer scholarships to high-achieving school leavers to study education with a focus on areas of undersupply, currently maths, science and.ITŠRecruiting high performing students into a teaching career will be a thirty year investment in raising the standard of teaching. The scholarships will.be structured so that each teacher's HECs debt will be paid by the Commonwealth Government each year they remain teaching. This means.that a teacher would receive about $1,500 a year for up to ten years, if they.stay in the profession.".(ALP Shadow Minister for Education, Michael Lee in a speech to the Sydney Institute, Monday March 6 2000)

The Minister for Education is also working to address this issue.

Issue: A National Site-Licence for Academic Electronic Information

The Australian research enterprise is critically dependent on speedy.access to global information, including access to scientific and scholarly journals. FASTS supports developing a coordinated national strategy.to facilitate access by universities and major research institutions to electronic academic publications.

Response:.Minister David Kemp has acknowledged the urgency of the.problem, and his interest in assisting the sector to find solutions. A number of.investigative studies have been commissioned by DETYA to contribute to.the development of the higher education information infrastructure. DETYA is looking at a number of overseas initiatives, including.Canada's Foundation for Innovation for the national site licensing for.electronic journals and databases in identified fields at a cost of around $50 million; and the Joint Information Systems Committee (JISC) funding of university library infrastructure in the United Kingdom.

Issue: Science for the Bush

The provision of sufficient bandwidth for electronic transmission of information is a major problem for rural and regional Australia. Inadequate bandwidth and slow access speed is a crucial limitation to the uptake.of S&T. FASTS calls upon the Government to ensure that rural and regional Australia has access to digital transmission services of comparable bandwidth to those available in metropolitan areas.

Response:.The Government recently announced a $150 million project to provide untimed local phone calls to 37,000 remote phone customers. This will reduce the cost of internet and e-mail access to many people. The ALP plans to modify its telecommunications policy to widen services.to the country to provide access to data services such as the internet. The draft policy will be discussed by the Executive this month, and.finalised by July.

Cooperative Research Centres

Every few years, the Government of the day re-examines the future of.the CRC Program. This ad hoc arrangement, which results in unpredictable schedules for CRC proposals, does not recognise the long lead time.required for building collaborative links that result in high quality proposals.and effective business plans. The success of the CRC Program has earned it.the right to be established as an ongoing part of the Australian R&D.landscape.

FASTS suggests that bipartisan support be given to the long term continuation of the Cooperative Research Centre Program.

Response:.Applications for a new round close in July 2000. There has.been no response from Government or Opposition on the issue of making a regular cycle of applications for CRCs.

FASTS ON THE KEMP WHITE PAPER

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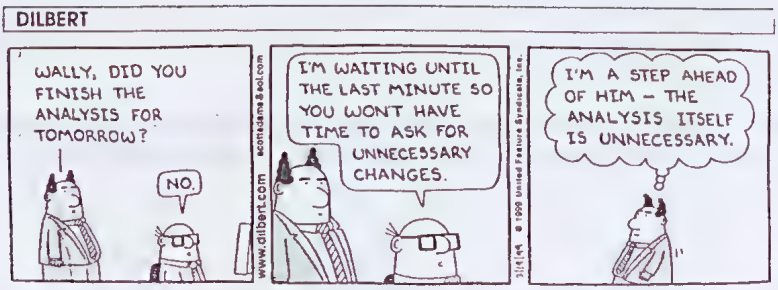
DILBERT
WALLY, DID YOU FINISH THE ANALYSIS FOR TOMORROW?
NO.
I'M WAITING UNTIL THE LAST MINUTE SO YOU WON'T HAVE TIME TO ASK FOR UNNECESSARY CHANGES.
I'M A STEP AHEAD OF HIM - THE ANALYSIS ITSELF IS UNNECESSARY.
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ANOTHER STRAW ON THE CAMEL'S BACK

Australia's peak council for scientists and technologists said today (Friday) that the imposition of a three and a half per cent clawback on funding for research agencies and programs will be another burden on the national research effort.

The clawback was contained in the fine print of last week's Budget, and will affect groups such as CSIRO, AIMS (the Australian Institute of Marine Science in Townsville), and ANSTO (Australian Nuclear Science and Technology Organisation) if it proceeds as indicated.

Programs to support science commercialisation and science awareness will also be affected, as will the CRC (Cooperative Research Centres) Program.

Professor Sue Serjeantson, President of the Federation of Australian Scientific and Technological Societies (FASTS), said letters faxed out by the Minister after the Budget have caused anxiety among research organisations.

"It is still not clear who will be affected by the clawback," Professor Serjeantson said. "If it applies to CSIRO and other research agencies, will it also be applied to research grants administered in other portfolios, like education and health?"

"Other countries are pumping money into science and research as an investment, but Australia is out of step.

"Our research agencies are operating on the sniff of an oily rag. They can't afford to lose any funding at all," she said. "In the end, funding cuts mean job losses and the curtailment of the sort of research that could generate new industries."

Professor Serjeantson said she is writing to the Minister for Industry, Science and Resources, urging him to reconsider in light of the likely impact on research agencies and programs.

The clawback appears to be based on flawed thinking from Treasury. The three and a half per cent figure is apparently based on Treasury expectations that research groups will save money from the abolition of the wholesale sales tax when the GST is introduced.

"But most research organisations will save very little with the GST," Professor Serjeantson said. "Generally they work in a tax-exempt environment, and do not pay wholesale sales tax on equipment and supplies like computers and printing.

"Most of the Budget goes on salaries, not on goods and services.

"So the amount they save will be minimal. By the time the cost of compliance with the GST is taken into account, any potential savings from the change to a new tax system may have vanished."

She said several groups have indicated they will be taking up the Minister's invitation to write to him with their concerns.

AUSTRALIA DOOMED TO CARRY "OLD-ECONOMY" TAG

Australia's peak council for scientists and technologists said that tonight's Budget confirmed that Australia would continue to wear the "old economy" tag given it by international money markets.

Professor Sue Serjeantson, President of the Federation of Australian Scientific and Technological Societies (FASTS), said that national policy had failed to come to grips with the speed the world is moving.

"The rest of the world is investing in research and innovation while Australia considers reports," she said. "This Budget has not made the necessary investment decisions, and we are falling behind.

"Australia is failing to keep up with the challenges of the knowledge-driven economy. The future lies in industries based on high technology, and this requires investment in research, development, innovation and industry links

She pointed to a study released yesterday by the University of Melbourne, showing education expenditure by the Government is at its lowest level since 1991-92.

"This Budget should have doubled the funding for the Australian Research Council, which would have helped reverse the decline in funding for Australian universities.

"It should have encouraged more scientists and mathematicians to become teachers, to inspire the next generation. It should have worked to reverse the decline in R&D by industry, and it should have restored funding stripped out of universities since 1996."

Professor Serjeantson said the Government would excuse its general inaction because it is working through a process. Both the Innovation Summit Implementation Group and the Chief Scientist are scheduled to release major recommendations in the next few months.

"But Australia can't wait until Budget Day in 2001 for the Government to authorise expenditure in these areas. These recommendations should be implemented in a special mini-Budget as soon as they are released," she said.

Professor Serjeantson said the only bright spot in an otherwise gloomy budget was additional funding for medical research, and some sorely needed assistance to the higher education sector.

"Now let's see the Government deal with 'unfinished business' in other areas of science, technology and higher education," she said.

Professor Serjeantson said the Government was pinning too many hopes on stimulating private investment in research and innovation.

"Amending the capital gains tax system is a positive move, and I understand this has led to a healthy increase in venture capital investment in these areas. But the Government has a responsibility to invest in its own right, for all Australians with an interest in the future."

THE BILLION DOLLAR INVESTMENT

FASTS has released a list of spending priorities for science and higher education in Australia.

Professor Sue Serjeantson, President of the Federation of Australian Scientific and Technological Societies (FASTS), said that a new national investment was needed to stimulate new high-wage, high-technology industries in Australia.

"This is a quick list of how to spend one billion dollars to Australia's advantage," Professor Serjeantson said. "It's a lot of money, but the return to Australia will be immense.

"The cost of not making this sort of investment is frightening. What sort of jobs are we going to have in Australia ten, twenty, thirty years from now, if they are not based on innovative science and technology?"

She said the billion dollar list is designed to flag issues the Government will address in its response to the Innovation Summit (due 30 August) and the Chief Scientist's Capability Review (due November).

"The science community has been very patient with this Government," she said. "We are aware that processes have to be worked through, but every day Australia delays investment in the knowledge-based economy is another day we fall further behind.

"This is a first go at setting national priorities in these areas. We are not talking about a one-off hit, but an amount the nation needs to commit each year."

How FASTS would spend an extra billion dollars a year in research and higher education:

* Double funds to the Australian Research Council large grants
$100 m * Improve laboratories and libraries in universities
$100 m * New scheme to provide major national research facilities
$60 m * Retraining, HECS relief for new science and maths teachers
$20 m * Assist libraries with electronic subscriptions to journals
$10 m * Measures to stimulate careers for younger scientists
$50 m * Tax credits to stimulate innovative companies
$250 m * Additional funding for the CRCProgram
$50 m * Priority environmental projects
$40 m * Boost funding to science agencies (CSIRO, AIMS, AGSO etc)
$70 m * New commercialisation stimulants
$20 m * Increase funding to awareness programs, particularly in industry
$20 m* University salary equivalence for NHMRC and ARC fellowships
$10 m * Overdue university salary increases (scientists' share)

A POSTCARD FROM THE FREE MARKET

AN OCCASIONAL SERIES BY TIM DOEG

ROUND UP THE USUAL SUSPECTS

The phone call came at 9:01 am on the Monday morning. Had I seen the tender advertised in the Saturdays paper?.Yes. Had I downloaded the tender documents and project brief from the Internet site?.Yep, did it straight away. Would I be interested in joining their consortium (lets call them Major Company A) in putting forward a proposal for the work. Sure.

This raises two major issues. One, the Internet can be a wonderful thing; it allows documents and stuff to be obtained right there and then – no waiting 'till Monday to put in the phone call, then waiting 'till Wednesday or Thursday to collect the thing in the post. Right then and there. Within 5 minutes of learning of the project, the document is there on the screen (hands up who automatically prints it before reading it to see if it is worth while.... shame on you for such paper profligacy). The second issue .... What the hell am I doing working on a Saturday!.But that's another story.

But anyway, one of the best things about being a lone consultant is you get to do a wide diversity of work with a wide variety of people. One week, I can be down deep in the East Gippsland forests, talking fish and bugs with landowners, and the next week I can be at the other end of the state, in the dry Wimmera talking to industry type people about vineyards and water use and stuff. Then up to the Loddon catchment looking at river management issues with Catchment Management people, then back to Melbourne to try and sort out something to do for the poor old Mullum Mullum Creek with interested members of the public. So there's never really a dull moment. You never know what is going to come up, or where you will be, or who you will be working with.

And as a lone consultant, the opportunity to work with a wide variety of people is one of the pleasures of the work. Not having worked with Major Company A, it seemed like a good opportunity to see what they were like. It would be interesting to interact with someone new ... oh ... and they get a lot of work which just might involve me in the future if we work together well. They had also arranged for a number of other lone consultants (let's call them X, Y and Z). Haven't worked with them either, so they could be interesting as well. It's always good to get a different slant to things from different directions.

The second phone call came at 9:05 am. Had I ....? Yes. Had I ....? Yes. Would I ....?

Mmmm. Starts to get just a bit tricky here. Let's call them Major Company B. They would be interesting too, a different group with different skills. Might learn a bit about something else with them. Also, they are trying to put lone consultants U, V and W into their Consortium, whom I know well and have worked with effectively before.

Three choices become apparent. Say "yes" and don't tell them about Consortium A. Not an option, because it's a small world and such deception is sure to get noticed. Say "no" because I'm already agreed to be a part of Consortium A. Not a good option, what if B gets the job – then I've missed out on the work.

Take the third option. Yes, I'd love to be part of your bid. However, you should be aware that I have already been contacted by another group (don't name them!) and have agreed to be part of their bid. I'm afraid I can't be exclusive. No worries?.Good.

The third phone call came at 9:15 am. Yes, I'd love to be part of your bid, Major Company C – and it seems like a good team with lone consultants T, X and V (so X and V had also got calls that morning!). But be aware that I am also involved in bids with 2 other groups – and no, I can't say who they are.

The fourth call came at 9:35 am. Major Company D and T and Z and W are getting together. Yep, fine, put me in as well.

By mid-day, I just about had the job sewn up – everyone I could think of was putting in a bid for the same job. I was now in bids from pretty well all the major players in the industry.

This sort of stuff happens often in the world of the small consultant. Not all major environmental companies have the wide range of skills it takes to complete a relatively large multi-disciplinary consultancy. Each has a core business – hydrology, ecology, geomorphology, water chemistry, engineering, bugs, fish etc, but none have the total range of skills, so they call on a number of smaller consultants to provide the skills that they are lacking.

This has a number of major benefits. Over time, you get to work with numerous organisations and learn a lot about their core business (e.g. I had no idea that hydrological modelling operated like it does – so you just multiply by the "factor", take away the number you first thought of, and ….). It increases your appreciation and knowledge on a variety of subjects all the time. You get to work with a number of other lone consultants and learn about business practices (" …. so tell me again about this Professional Indemnity Insurance stuff") and different ways of operating ("… so you pay for the car yourself and then the company pays you rent for the car equal to twice what you are paying it off at").

Of course, there are downsides. Confidentiality is paramount. You can't reveal who else you are working with (but they should guess that the usual suspects are involved). You can't reveal anything about alternative bids. You have to put the same effort into each bid, even if you end up thinking that one group may have more chance than others. And you may have to go to multiple interviews – and try to think of ways to say why this particular consortium is better than the others – even though you have just come out of another interview where you said why that consortium would be better than the one that you're currently saying is better than the other one.

And not everyone can be successful. It will end up that you do part of the work, while a colleague or friend who was involved in another bid with you misses out. That's just par for the course. Or you miss out on work when a colleague or friend on the same bid is also part of the winning bid. In that case, they're now a sneaky, conniving bastard (just joking)!

But what the hell. It can be a neat way to do work.

ANNOUNCEMENTS

ECOLOGY IN A RAPIDLY CHANGING WORLD

ESA2000 – Conference of the Ecological Society of Australia, Inc.

Melbourne, Victoria.
29 November – 1 December.2000

The aim of the conference is to capture the wide range of ecology traditionally presented at ESA and also particularly focus on how ecological research can help better measure and interpret change.

For further information at this stage, see:
http://life.csu.edu.au/esa/

Further details in September issue of the newsletter

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INTERNATIONAL SYMPOSIUM

ON

THE ROLE OF DROUGHT IN AQUATIC SYSTEMS

FEBRUARY 12-14, 2001

ALBURY, NSW. AUSTRALIA

For further details see conference capers section in this issue

AUSTRALIAN WETLANDS FORUM

In collaboration with various other interest groups ASL will assist in hosting the first meeting of the Australian Wetland Forum on. Saturday 8 July 2000, Darwin.

The forum will provide an opportunity for all interest groups and individuals to develop a strategy to Stop and Reverse the Loss and Degradation of Australian Wetlands.

Invited speakers will be asked to address specific themes that will provide a .basis for discussion and developing the strategy. Audience participation is critical and will be encouraged through discussion sessions and the release of draft materials before the meeting.

This is an opportunity for you to have a comment on the future of .Australia's vital wetland resources. Wetland managers, owners, users and . researchers are encouraged to attend and have their say.

The inaugural Australian Wetland Forum is an opportunity for interested wetland scientific and conservation groups to develop a consensus-based document on wetland conservation and management in Australia for the next decade. A specially convened meeting, linked with ASL 2000 in Darwin, will set this agenda for wetlands. Invited expert talks and workshop discussion sessions dealing with wetland ecology, management, and government policy, will build on an initial draft document prepared for the day. The final form of the document will reflect the consensus of the meeting. Thus, it will be 'owned' by the meeting, not by any one stakeholder at the Forum.

Each stakeholder will be able to use the document or a component of the document as related to their personal agenda or needs. The document will be short and produced in plain language and widely circulated to primary stakeholders, agencies and wetland users, owners and managers.

The meeting would have an open invitation. Costs could be sought from government sources and through registration fees, with logistical support being sought from appropriate local organisations.

The document produced by the Forum will be aimed at general users and managers of wetlands and the general public. It would outline specific strategies for Stopping and Reversing the Loss and Degradation of Australian Wetlands, with major actions listed and described. Several models are available from elsewhere around the globe – for example, the Mediterranean Wetland Program and the Canadian Environment Roundtable, but the output will be very much tailored towards Australian needs.

The Forum could potentially provide a means of commenting on existing and future policy and actions, provide input to government programs, and extend communication as is being promoted in other fora such as the Wetland Care meeting in late-1999.

INTERACTIVE KEY AND INFORMATION SYSTEM FOR THE ESTUARINE ANDFRESHWATER MOLLUSCS OF NSW: A NEW CD

W F Ponder, S A Clark & M J Dallwitz

This CD-ROM contains an interactive identification system for native and introduced molluscan species living in estuarine and freshwater environments in New South Wales, Australia. It can also be used to identify many species in the similar faunas of eastern Victoria and southern Queensland. It is the first fully illustrated, interactive key to molluscs.Freshwater and Estuarine Molluscs is an easy-to-use, interactive key run by the excellent program Intkey. The information provided is based on the literature, the personal experience of the authors and the extensive collections in the Australian Museum.

Features
* A comprehensive keying system to 344 species, including characteristics useful in distinguishing each taxon

* For each species, habitat and distribution information, basic taxonomic information (including synonyms), relevant literature, and common names for the larger species

* Well over 1000 images, including illustrations of character states, and
colour photographs of shells and living animals

* An interactive glossary of the terminology used
System requirements

* Windows 95 or later, NT or later

* SVGA monitor (800 x 600 and thousands of colours)
* CD-ROM drive

CD-ROM, ISBN 0643065784, $99
Order on line at www.publish.csiro.au
or contact CSIRO Publishing Sales:
freecall 1800 645 051 (intl +613 9662 7666)
fax 03 9662 7555 (intl +613 9662 7555)email sales@publish.csiro.au

LATEST PUBLICATIONS FROM L.W.R.R.D.C.

The latest publications from LWRRDC-funded R&D are:

(1) 'Riverine and Wetland Salinity Impacts - Assessment of R&D Needs', by Paul Bailey and Kimberley James, Monash University. Scoping review of status of knowledge on the impacts of salinisation on rivers and wetlands, management of current research, and R&D gaps.

(Occasional Paper 25/99, $10 plus postage & handling. Available from AFFA Shopfront, 1800-020-157)

(2) 'The National Eutrophication Management Program - A Review', by Peter Chudleigh and Sarah Simpson, Agtrans Research. NEMP has focussed on understanding sources of nutrients and other factors contributing to algal blooms. This report reviews the effectiveness of the program to date.

(Occasional Paper 05/00 - Electronic Publication (pdf format) at: http://www.lwrrdc.gov.au/ or photocopy-on-demand ($12 plus p&h) from AFFA Shopfront, 1800-020-157)

(3) '1998/99 Australian Irrigation Water Provider Benchmarking Report', Australian National Committee on Irrigation and Drainage. Addresses system, environmental, business and financial performance. Available from ANCID - contact John Mapson, Goulburn-Murray Water, johnmap@g-mwater.com.au

(4) New editions of the following newsletters have been released:

- 'RipRap' (Riparian Lands Management)
- 'Focus' (National Dryland Salinity Program)
- 'Water Wheel' (National Program for Irrigation Research & Development)

(Contact: public@lwrrdc .gov.au.)

For a list of all LWRRDC publications see: http://www.lwrrdc.gov.au

FORTHCOMING CONFERENCE:

WATERWATCH NATIONAL CONFERENCE 2000

'The Next Bend in the River', 20-24 November 2000

Nathan Campus, Griffith University, Brisbane

'The Next Bend in the River' aims to promote and advance community water quality monitoring in Australia by:

- progressing and developing community programs;
- providing a forum for people to work together and share knowledge and experiences;
- providing professional development opportunities for Waterwatch program coordinators.

Up to 200 participants will attend presentations, workshops, displays, and information exchange workshops. The focus will be on sharing ideas, learning practical new methods and on networking with other committed natural resource managers from across Australia.

Expressions of interest for the presentation of workshops and other sessions can be directed to Nadia Kingham, Wetlands Unit, Environment Australia on (02) 6274 2312. For further information, please contact:.Carillon Conference Management on (07) 3368 2644, fax: (07) 3369 3731 or email: mail@ccm.com.au

NOMINATIONS FOR ASL EXECUTIVE ALL NOW DUE FOR ALL POSITIONS:

PRESIDENT, VICE-PRESIDENT, SECRETARY, TREASURER, AND EIGHT EXECUTIVE MEMBERS

TO BE ELIGIBLE FOR NOMINATION YOU NEED TO BE:

* an enthusiastic advocate of the society and the role it can play in the understanding and management of Australian inland waters

* willing to contribute to the running of the society in at least one the following areas: - liaison with congress organisers - policy coordination - submissions coordination - media - liaison with membership and membership officer - awards - promotional matters - publications - website/newsletter/listserver

* willing to represent the society in your geographical area

Your preliminary nominations can be forwarded to any of the following: the
President P. Horwitz p.horwitz@cowan.edu.au.OR
the Secretary R.Marchant rmarch@museum.vic.gov.au. OR
the newsletter editor I. Growns grownsi@fisheries.nsw.gov.au

BY 7th JULY 2000

TO BE ELIGIBLE YOU WILL BE FINANCIAL MEMBER OF ASL, AND YOU MUST BE PRESENT, OR REPRESENTED, AT THE AGM IN DARWIN ON JULY 9TH 2000, WHERE YOU WILL NEED A NOMINATER AND SECONDER, EACH OF WHOM WILL BE A FINANCIAL MEMBER OF ASL.

ASL encourages any of its members to be involved in the affairs of the society, and the society strongly values the contributions that postgraduate students have made, and continue to make, to the Executive.

ARTICLES

DRAFT ASL POLICY ON CARP IN AUSTRALIA

Carp in Australia – the present situation

Carp are among the most widespread, and the most significant, of the animal species that have been introduced to Australia's waters. *Cyprinus carpio* now occurs in every State and is the dominant fish species in rivers of the Murray-Darling basin below about 500 metres altitude. Carp have become the focus of intense debates, initially about their environmental impacts and, more recently, about potential control methods. In rural communities especially, there is widespread support for the view that carp invasions of Australia's fresh waters is a national environmental problem. It is a noxious species in a number of States.

The issues

Environmental effects

During the rapid spread of the 'Boolara' strain of carp introduced to Victoria in 1961, it interbred with other carp strains that had been in Australia for up to a century. The great numbers that appeared in some waterways, and concerns over their potential impacts, prompted research to clarify the environmental effects of the carp invasion. A substantial number of studies have been completed and others are continuing. Following is a brief synthesis of the present results.

The main environmental effect of carp results from their bottom-feeding behaviour, which occurs when insufficient preferred foods are readily available in the water column. The fish suck in mouth-fulls of sediment, sifting through it for material that (to them!) is digestible, expelling the remainder into the water column. Under some conditions, at least, this results in increased turbidity, release of sediment nutrients, dislodging of submerged aquatic plants, and interrupted plant regeneration.

The great abundance of carp, especially in the warm, still waterways they prefer, combined with their generally large body size, can result in very high carp biomass. Population densities up to one carp per square metre of water surface area have been recorded. Such dense populations not only make great demands on the food web, but also excrete large quantities of wastes into the water. Secondary effects that can follow these environmental disturbances by carp include altered aquatic animal communities, changed habitat conditions for various plants and animals, loss of aquatic plants and promotion of algal growth.

The environmental impacts of carp in Australia have occurred alongside other large-scale ecological disturbances such as water diversion, damming, riparian damage, erosion, various forms of pollution and the impacts of other alien biota. Many of these disturbances interact; for instance, carp succeed better in habitats that are more disturbed by agriculture and river regulation. In this complex situation it is difficult to ascribe general changes to individual causes. As an example, carp are undoubtedly implicated to some degree in the decline of native fish, but they are only one of many causes.

Disease effects

A recent survey in New South Wales showed that the incidence of externally visible abnormalities of fish was directly related to the density of carp. The spread of the damaging parasites 'anchor worm' (*Lernaea*) and a virulent tapeworm, *Bothriocephalus*, probably followed carp invasions.

Beneficial values

The great abundance of carp supports a minor fishery in some areas and provides some recreational-fishing value. Small amounts of fresh or canned carp are used for human consumption, other catch is directed to fertiliser production, or used as crayfish bait.

Potential for further spread

As the world's most widely distributed freshwater fish, carp have clearly shown their adaptability and tolerance of varied conditions. They survive in an extremely broad range of temperatures and water qualities, being tolerant of low dissolved oxygen and brackish conditions. Carp's spread has been facilitated by floods, and inhibited by natural and artificial barriers. But they have continued to progress steadily into higher altitudes and across catchment boundaries through their powerful migratory responses in floods and, occasionally, through deliberate (and illegal) human transportation. 'Rains of fishes' during intense thunderstorm activity are another potential source of spread. The ornamental koi strain of carp is strongly represented among wild populations and its continuing culture in ponds is a serious source of new infestations. Carp do not survive in seawater and therefore cannot migrate along coasts.

The main regions currently threatened by further expansion of the range of carp include:.

- .the many coastal river catchments of the south-east that are still free of them,
- .the large coastal catchments of central and southern Queensland,
- .inland drainage systems such the Lake Eyre tributaries,
- .rivers in south-west Western Australia,
- .Tasmanian rivers, and
- .waterbodies near population centres where koi are kept

Potential controls

Increasing community concern has driven a search for ways to control carp and a series of groups representing State and Commonwealth governments, research bodies and community groups have been established to pursue effective controls. Potential control methods can be classified as targeted fishing, biological control or environmental rehabilitation.

Targeted fishing involves applying recreational or commercial fishing gear to selectively remove carp, mainly the larger fish. This simple approach produces visible results, and has achieved considerable public support. It is limited by the need to continue efforts indefinitely, the relatively small number of areas where it can be applied and the marginal viability of commercial projects.

An important difficulty with fishing methods is that many carp populations appear to be self-limited by a feedback mechanism, whereby adult fish in dense, highly competitive populations eat their own eggs and larvae. When adult numbers are reduced, the survival of young carp may be greatly enhanced, so that the total numbers of carp actually increase and a strong new generation emerges.

Biological control involves a search for methods that will selectively affect carp populations. Initial studies have been done in Victoria to evaluate a virus pathogen of carp. Another project at Narrandera is studying the value of a carp-specific, poison-baiting method, and work at Mildura is examining pool draw-downs after spawning as a way of limiting population recruitment. A project is under way in Hobart to assess the feasibility of genetic manipulations to restrict breeding or induce early mortality.

Environmental rehabilitation as a carp-control method is based on the knowledge that carp are more successful in disturbed habitats. Rehabilitation of damaged freshwater ecosystems will increase their resilience and resistance to invasion by alien species like carp. Key aspects of rehabilitation plans include rehabilitating ecosystem processes and components including fish passage past dams and weirs, environmental flows, riparian vegetation, thermal regimes below dams, and salt levels.

Knowledge gaps

Gaps in knowledge about carp in Australia continue to stimulate research. Studies to evaluate control methods remain among the highest-priority national environmental projects. Work to assess the environmental interactions of carp continues to be fruitful. There is a need to improve understanding of carp's vector role in fish diseases. Modelling studies of carp's significance for nutrient dynamics and problems with blue-green algae are likely to provide important insights for water managers.

Recommendations

The ASL goal for carp is:

'To conserve Australia's freshwater environments, in collaboration with other relevant bodies, by achieving a sound scientific understanding of the significance of carp and promoting development and use of suitable carp-control methods.'

To pursue this goal, ASL recommends:

•.That government funding agencies include scientific projects addressing the knowledge gaps listed above amongst their highest priorities for support.

•.That concerted action be taken by the inter-agency Carp Control Co-ordinating Group to implement effective measures to prevent the further spread of carp in Australia.

•.That carp be identified as a noxious species in all relevant jurisdictions.

•.That carp-control projects should be subjected to independent scientific scrutiny of their effectiveness.

Comments relating to this draft should be forwarded to

Dr John Harris
56 Alkaringa Road, Miranda 2228 Australia
Phone 02 9525 2812, Mobile 0409 952528, Fax 02 9531 6222, email jharris@sydney.net

HARMFUL CYANOBACTERIAL BLOOMS FROM SEMIARID FRESHWATER ECOSYSTEMS OF NORTH-EAST BRAZIL

This article follows from the article "Nasty Blue-greens kill (again)" published in the last newsletter

Naithirithi T. Chellappa, Maria Aliete M.Costa & Ivaneide Do Rosario Marinho
Departamento de Oceanografia & Limnologia, Universidade Federal do Rio Grande do Norte, Natal/RN.59.014-100, BRAZIL.

Phytoplankton has been regarded as fundamental components of fisheries research and the yields of fisheries depend on them in the tropical waters. Ichimura and Watanbe (1977) recognised that the chemical characteristics of freshwater reservoirs of tropical waters vary with its age and cause natural eutrophication, while cultural eutrophication accelerates the process and brings in undesirable growth of toxin-producing algae. In recent years, tropical Northeast Brazilian reservoirs facing cultural eutrophication and causing increased growth of phytoplankton, more specifically, the frequency and severity of populations of cyanobacteria doubled. Semiarid environment provides harsh hostile aquatic environment with alternating period of extended dry period and the limited wet season and cyanobacteria are considered to be most versatile to adapt and grow in this particular environment (Chellappa, 1998).

The state Rio Grande do Norte situated in the semi-arid Northeast Brazil, is one of the developing states, within the developing nations, where water resources are limited to man-made reservoirs. These inland waters provide the populations with potable waters, to help irrigation facility as well as intensification of aquaculture, particularly to grow the Amazonian fish tambaqui, *Colossoma macropomum*, in cage culture.

The present register on fish and prawns mortality was carried out in Gargalheiras reservoir. The reservoir (popularly known as Marechal Dutra impoundment) is situated 223 Km from Natal, capital city of Rio Grande do Norte State. It is a shallow impounded water body in the semiarid climate, evaporation rate was greater than precipitation, and the irregular inflows generally are balanced by outflow. It is used mainly for irrigation, fisheries and recreation (tourist) purposes and is located in the Municipality of Acari. This covers an area of 18 ha. with an average depth of 15 m. The volume of the water when it is fully fed reaches up to 43 billion cubic meters. Physiological ecology of the cyanophycean populations of Gargalheiras reservoir was treated in detail before the introduction of cage culture in Acari Municipality. (Chellappa et al. 1998). The Cage culture practise was commenced from later part of 1998 to promote growth of tambaqui to supplement protein food for the impoverished local population (Figure 1).

Cage culture is a relatively inexpensive and convenient way to rear fish and is introduced to improve the quality of poor-people in Brazil. Merola and Souza (1998) was the first to use cage culture in Brazil for tambaqui and pacu, the two Amazonian fishes for their high protein and rapid growth characteristics. Chellappa et.al (1995) conducted experimental culture of the tambaqui in fixed cages, using balanced supplementary feed in oligotrophic lake Urubu, in the state of Rio Grande do Norte of Brazil. It attracted politically motivated big landlords who traditionally control the water resources of this region. The politically motivated shift in priority from agricultural activity to intense aquaculture practises facilitated them to obtain bank loans with low interest rate in order to mobilise this intermediate technology to give consistent employment opportunity to local fishermen

around the reservoir and to produce more protein-rich fishes. Intense aquaculture practice soon gave way to indiscriminate feeding practice to increase the growth rate of fish and non-ecological orientation. This practice, presently beginning to show significant environmental impact culminating self defeating methods to fish mortality instead beneficial production of fish in cage culture.

Feeds were mostly used on non-scientific basis and the cultural eutrophication in the form of organic pollution was introduced and provoked uncontrollable growth of Cyanobacteria such as *Pseudanabaena, Microcystis, Oscillatoria, Anabaena* and *Cylindrospermopsis* in greater proportion. The *Pseuanabaena* dominates as much as 82.0% during the mortality of fishes and freshwater prawns of the Gargalheiras reservoir. During the 48 hours (20-22 of January 2000) nearly all the fishes were wiped out including *Colossoma macropomum* grown under the cage.

Toxic cyanobacteria received much attention from world over (Bell et al. 1996; Carmichael, 1992) and including reports from Brazil (Azevedo, et al.1994). We report here, the occurrence of Cyanobacteria bloom that coincided with the mass mortality of freshwater fishes and prawns including the Amazonian tambaqui fish grown in fixed cages (Figure 2). We attribute the explosion of *Pseudanabaena schimdlii* species to high pH, water temperature and excess of inorganic nutrients emanated from the decomposition of indiscriminate food items (Table 1 & 2). The present study is a preliminary report to encompass future ecotoxicological analysis.

Table 1 Preliminary Data collected at the time of collection in the Gargalheiras reservoir of Acari/RN, Brazil.

Time interval Hours after mortality of organisms	pH	Temperature ^{0}C	Dissolved oxygen Mg/l	Ammoniacal-nitrogen $\mu g.l^{-1}$	Nitrate-nitrogen $\mu g.l^{-1}$	Orthophosphate $\mu g.l^{-1}$
4.00	8.85	30.5	5.85	828	112	86
8.00	9.20	29.5	6.20	735	85	72
12.00	9.20	31.0	6.45	728	90	64
16.00	8.80	30.0	5.75	620	92.5	55
20.00	9.05	29.0	5.20	445	66	37
24.00	8.25	28.0	5.25	420	62	34
36.00	9.30	31.0	6.58	338	55	38
48.00	8.35	27.5	5.28	405	50	32

Table 2. List of phytoplankton species and their percentage dominance

Phytoplankton communities of Gargalheiras reservoir (January 2000) recorded at the time of fish and prawns mortality	Percentage composition (%)
Cyanophyceae (Cyanobacteria)	93.5
Pseudanabaena schimdlei Jaag.	82.0
Oscillatoria limnetica Lemm.	2.5
Microcystis aeruginosa Kütz.	5.0
Anabaena planktonica Lemm.	1.0
Cylindrospermopsis raciborskii (Wolosz) Seenaya and Subaraju	3.0
Bacillariophyceae	5.5
Cyclotella meneghiniana ü	2.5
Melosira varians Ag.	1.0
Navicula sp.	2.0
Chlorophyceae	1.0
Scenedesmus quadricauda	
Coelastrum sp.	
Oocystis lacustris Fott	

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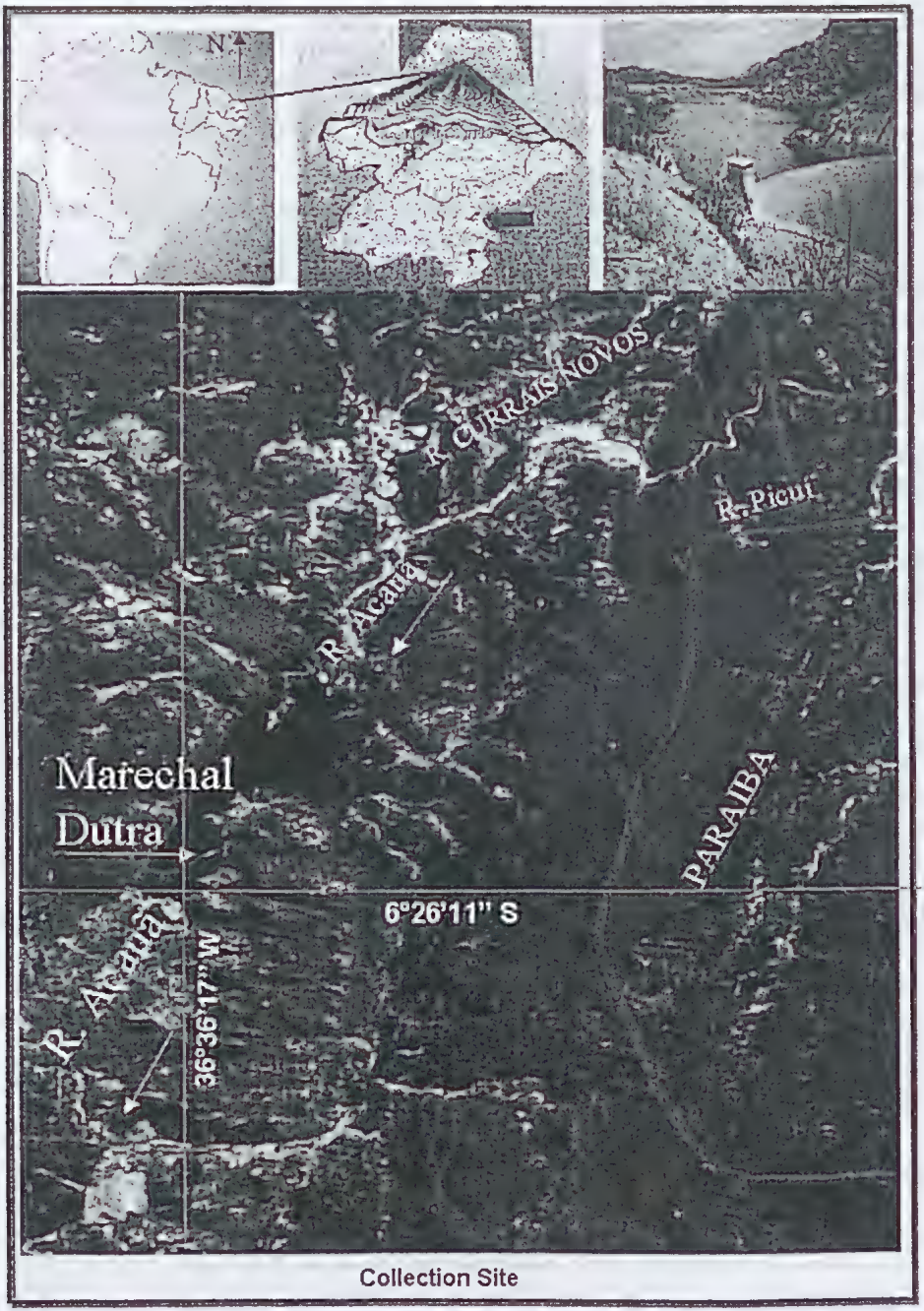
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R. CURRAIS NOVOS
R. Picuí
R. Acauã
Marechal
Dutra
PARAIBA
6°26'11" S
R. Araua
36°36'17" W
Collection Site

Mortality of fishes and prawns

LIGHT BULBS

Q: How many scientists does it take to change a light bulb?
A: None. They use them as controls in double blind trials.

Q: How many academics does it take to change a lightbulb ?
A: None. That is what their students are for.

A: Five: One to write the grant proposal, one to do the mathematical modelling, one to type the research paper, one to submit the paper for publishing, and one to hire a student to do the work.

Q: How many senior researchers does it take to change a lightbulb?
A: Five; one to change the lightbulb, the other four to stand around arguing whether he/she is taking the right approach.

Q: How many research technicians does it take to change a lightbulb?
A: One, but it'll probably take him/her three or four tries to get it right.

Q: How many post-doctoral fellows does it take to change a lightbulb?
A: One, but it'll probably take three or four tries to get it right because he/she will probably give it to the technician to do.

Q: How many students does it take to screw in a light bulb?
A: Only one, but it may take upwards of five years for him to get it done.
A: It all depends on the size of the grant.
A: Two and a academic to take credit.
A: 1/100. A student needs to change 100 lightbulbs a day.

Q: How many general relativists does it take to change a light bulb.
A: Two. One holds the bulb, while the other rotates the universe.

Q: How many quantum physicists does it take to change a lightbulb ?
A: One. Two to do it, and one to renormalise the wave function.
(Explanation - Renormalising the wave function is something that has to be done to a lot of quantum physics calculations to stop the answer being infinity and makes the answer always come out as one.)

Q: How many quantum mechanicians does it take to change a light bulb?
A: They can't. If they know where the socket is, they cannot locate the new bulb.

Q: How many Heisenbergs does it take to change a light bulb?
A: If you know the number, you don't know where the light bulb is.

Q: How many astronomers does it take to change a light bulb?
A: None, astronomers prefer the dark.

Q: How many radio astronomers does it take to change a light bulb.
A: None. They are not interested in that short wave stuff.

Q: How many particle physicists are necessary to change a light bulb?
A: Two hundred: 136 to smash it up + 64 to analyse the tiny pieces.

Q: How many statisticians does it take to change a lightbulb?
A: 1-3, alpha = .05
A: This should be determined using a nonparametric procedure, since statisticians are NOT NORMAL.
A: One -- plus or minus three (small sample size).
(Notes: Someone has been asking this as a bonus question on statistics exam papers for quite a while. Judging from some of his own students' exam answers, it depends on whether the lightbulb is negatively or positively screwed.)

Q: How many numerical analysts does it take to screw in a light bulb?
A: 0.9973 after the first three iterations.

Q: How many topologists does it take to change a light bulb?
A: It really doesn't matter, since they'd rather knot.

Q: How many mathematicians does it take to screw in a lightbulb?
A: None. It's left to the reader as an exercise.
A: Just one, once you've managed to present the problem in terms he/she is familiar with.

In earlier work, Wiener [1] has shown that one mathematician can change a light bulb.

If k mathematicians can change a light bulb, and if one more simply watches them do it, then k+1 mathematicians will have changed the light bulb.

Therefore, by induction, for all n in the positive integers, n mathematicians can change a light bulb.

Bibliography:

[1] Weiner, Matthew P., <11485@ucbvax>, "Re: YALBJ", 1986

CONFERENCE CAPERS

July 12-14, 2000: International Society for Ecosystem Health Symposium Brisbane. This conference will focus on bringing people together from typically disparate disciplines to focus on ecosystem health issues. The conference theme: "Transdisciplinary Approaches to Ecosystem Health", will focus on how knowledge from different disciplines can be integrated to advance our understanding of ecosystem health. http://www.cmis.csiro.au/iseh2000/

August 7-13, 2000, Australian Society for Fish Biology Conference, Albury NSW. Details can be found at http://www.hydro.com.au/asfb/

August 18th and 19th, 2000: The Way Forward on Weirs - Hosted by The Inland Rivers Network
A conference on the ecological, engineering, economic and social aspects of reducing the environmental impacts of weirs and other structures in waterways of south-eastern Australia. Centenary Theatre, Royal North Shore Hospital, Sydney. http://www.irnnsw.org.au
Or Contact Conference Convenor: Dr Stuart Blanch, Coordinator, Inland Rivers Network
Ph 02 9241 6267 or 0407 279 088, Fax 02 9247 1206, Email sblanch@irnnsw.org.au

6 - 8 September, 2000: Third International River Symposium - This symposium will examine and promote excellence in river management. Held in Brisbane, it will focus world attention on this important issue as part of an international effort to improve the health of our rivers and waterways. For more information, email symposium@riverfestival.com.au or try our website at http://www.riverfestival.com.au

November 20-24, 2000: WATERWATCH NATIONAL CONFERENCE 2000 'The Next Bend in the River' Nathan Campus, Griffith University, Brisbane For further information, please contact: Carillon Conference Management, phone:07-3368-2644 fax: 07-3369-3731 email: mail@ccm.com.au.

27 November - 1 December 2000: The 2nd INTERNATIONAL CONFERENCE ON APPLICATIONS OF MACHINE LEARNING TO ECOLOGICAL MODELLING.is being held in Adelaide, Australia. Sessions are scheduled covering topics relating to modelling the ecology.of.freshwater streams and lakes and fish stocks. For further details of registration please contact: Friedrich.Recknagel@Adelaide.edu.au

4- 8 December, 2000. Molluscs 2000 – Understanding Molluscan Diversity in our Region into the 21st Centuary. University of Sydney, Sydney. Contact Winston Ponder, Dept of Malacology, Australian Museum, 6 College St, Sydney, 2000
http://www.austmus.gov.au/science/division/invert/mal/malsoc/confer3.htm

OVERSEAS 2000

3-6 July 2000: 4th Asia-Pacific Conference on Algal Biotechnology (APCAB '2000) will be held in the `Pearl of the Orient', Hong Kong. The venue for the Conference will be the Hong Kong Convention & Exhibition Centre (HKCEC). Details -http://web.hku.hk/~sfchen/algae for online or , email the APCAB '2000 Secretariat at:algae@icc.com.hk

July 12-14, 2000, 4th International Symposium on Spatial Accuracy Assessment in Natural Resources and Environmental Sciences. Inquires B.M. Gerard, Heuvelink, Institute for Biodiversity

and Ecosystem Dynamics, University of Amsterdam, Nieuwe Prinsengracgt 130, 1018 VZ Amsterdam, The Netherlands, email accuray@frw.ava.nl.http://www.gis.wua.nl./Accuracy20000/

GLOW II is scheduled for 19th -22nd July 2000 in Sligo in the west of Ireland. The theme of the meeting is Sustainability: Research, Monitoring and Management. For details contact Dr K. Irvine kirvine@tcd.ie or Dr. M. Munawar munawarm@dfo-mpo.gc.ca

25 August - 1 September, 2000 - International Diatom Symposium. Greece, registration forms at http://www.uoa.gr/IDS2000/.

October 16 - 20, 2000: THIRD INTERNATIONAL SYMPOSIUM on EXTANT AND FOSSIL CHAROPHYTES will be held in NANJING, P. R. China under the auspices of the Chinese Acadmy of Sciences and the International Research Group on Charophytes.
If you are interested, please contact Qi-fei WANG, e-mail : qfwang@jlonline.com or.Ingeborg SOULIE-MARSCHE, e-mail : marsche@isem.univ-montp2.fr http://members.tripod.com/bruno.granier/3rd-charo.htm

FURTHER IN THE FUTURE

February 2001 28th International Association of Theoretical and Applied Limnology (SIL): Melbourne, Australia

February 2001 Symposium on the Role of Drought in Aquatic Ecosystems: Albury, Australia. If you would like to receive more information on the symposium, please send your contact details, area of expertise and whether or not you would like to present a paper or poster, to:-
The Organising Committee
Symposium on the Role of Drought in Aquatic Ecosystems
Murray-Darling Freshwater Research Centre and,
The CRC for Freshwater Ecology
PO Box 921
Albury, NSW Australia 2640
or e-mail: hump@mdfrc.canberra.edu.au (please include the word 'Symposium' in the subject heading).

28 JANUARY - 2 FEBRUARY 2001: XVIIth INTERNATIONAL SEAWEED SYMPOSIUM: CAPE TOWN, SOUTH AFRICA Please also feel free to contact our website at: http://www.uct.ac.za/conferences/iss Please e-mail to: ISS2001@botzoo.uct.ac.za

15-20 July 2001 9th International Congress on Invertebrate Reproduction and Development: Rhodes. University, Grahamstown, South Africa. Inquires Alan Hodgson, Rhodes University 6140 South Africa ph (+46) 6038526 fax (+46) 6224377.

August 2001 Seventh International Phycological Congress: Thessaloniki in north-eastern Greece. For more details, visit our website at: http://dictyocha.bio.auth.gr/7ipc2001 or try http://www.seaweed.ie/phycologia

August, 2004. 29th International Association of Theoretical and Applied Limnology (SIL): Helsinki, Finland.

ASL VOLUNTEERS

The following people have volunteered to speak as experts on behalf of the ASL. If you wish to be included on the list contact:

Dr Richard Marchant (ASL Secretary)
Email: rmarch@pioneer.mov.vic.gov.au

The following members are prepared to speak on behalf of the ASL on their area of expertise.

Name	Area of Expertise	Contact Details
Prof A. Arthington	in stream flows, ecology of exotic fishes, conservation of rare fishes.	Centre for Catchment & Instream Res, Griffith University, Natham Qld. 4111. Phone (07)275 7403 , Fax: (07)277 3759
Dr P. Boon	Bacteriological issues, wetlands.	Environmental Management, Victoria University of Tech., PO Box 14428 MMC, Vic. 3000. Phone (03)9365 2214, Fax (03) 9365 2465. email: paul.boon@vut.edu.au
Dr A. Boulton	Intermittent streams, hyporheic zones, Flinders Ranges	Ecosystem Management, University of New England, Armidale, NSW 2351. Phone (02) 67733760, Fax (02) 67732 769 email: aboulton@metz.une.edu.au
Dr M. Brock	temporary wetlands, aquatic plants	Botany Department, University of New England, Armidale NSW 2351. Phone (02)67732 578, Fax (02)67733 283 email: mbrock@metz.une.edu.au
Dr S. Bunn	stream ecology, ecology of riparian zones, biomonitoring	Faculty of Environmental Sciences, Griffith University, Nathan, Qld 4111. Phone (07)8757 407, Fax (07)875 7459, email: s.bunn@ens.gu.edu.au
Dr T. Entwisle	taxonomy and ecology of freshwater macroalgae	Royal Botanic Gardens, Mrs Macquaries Road.Sydney NSW 2000 phone 02 9231 8113, fax 02 9251 4403 email tim_entwisle@rbgsyd.gov.au
Dr M. Finlayson	wetlands, Ramsar convention	Alligator Rivers Region, Office of Supervising Sci, Post Office, Jabiru, NT 0886 Phone (08) 89799756, Fax (08) 89792149 email:maxf@eriss.erin.gov.au
Dr T. Grant	platypus biology	Biological Science, University of NSW, PO Box 502, Cronulla, NSW 2230
K. Hortle	impact of mining, impact of development in Se Asia and PNG on rivers	Environmental Management, 18 Sharrow Road, Mitcham, Vic. 3132 Phone and Fax: (03) 9872 4101

Dr P. Horwitz	Conservation of freshwater invertebrates	Dept of Science, Edith Cowan University, Joondalup Drive, Joondalup, WA 6027. Phone (08) 94055717, Fax: (08) 9300 1257 email: phorwitz@cowan.edu.au
Dr P. Humphries	fish ecology, in-stream flows	CRC Freshwater Ecology, MDFRC, PO Box 921, NSW 2640. Phone (02)6043 1002, Fax:(02)6043 1626 email: hump@watson.canberra.edu.au
Dr G. Jones	Cyanobacterial blooms	Phone: 07-3896 9516, Fax: 07-3896 9525 email:gary.jones@dnr.qld.gov.au
Dr P.S. Lake	stream ecology, conservation freshwater biota	Ecology & Evolutionary Biology, Monash University, Wellington Road, Clayton, Vic. 3168. Phone (03)9055 653, Fax:(03)9055613 email:p.s.lake@sci.monash.edu.au
Dr V. Matveev	plankton food webs, biomanipulation	MDFRC, PO Box 521, Albury, NSW 2640. Phone: (060) 431002, Fax: (060) 431626.
Dr R. Pearson	tropical freshwater ecology	Zoology Dept. ACTFR, James Cook, University, Townsville, Qld. 4811. Phone:(077) 814 262, Fax: (077)79 6371
Dr W. Ponder	freshwater molluscs	Malacology, Australian Museum, 6 College Street, SYDNEY 2000 Ph: (02) 9320 6120 Fax (02) 9320 6050 Email:winstonp@amsg.austmus.gov.au
J. Puckridge	ecology of arid zone rivers, ecology of freshwater fish	CRCFE, Zoology Department, University of Adelaide, Adelaide, SA 5005. Phone (08) 83034455. Fax: (08) 8303 4364 email:jpuckrid@zoology.adelaide.edu.au
Dr N. Rea	wetland plant ecology, water regime, weeds and conservation	Water Quality Branch, Department Lands, Planning and Environment PO Box 567 Palmerston NT 0831 Phone (08) 8924 6403, Fax: (08) 8924 6410, email: naomi.rea@nt.gov.au
Dr R. Shiel	planktonic & littoral microfauna, billabong ecology.	MDFRC, PO Box 921, NSW, 2640. Phone (02)60431002, Fax: (02)60431626 shielr@mdfrc.canberra.edu.au
Dr L. Townley	groundwater-surface water interaction.	CSIRO Division of Water Resources, Private Bag, Wembley, WA 6014 Phone (08) 9387 0329, Fax: (08) 93878211
Prof. W.D. Williams	Salt lakes	Zoology Dept, University Adelaide, Adelaide SA 5005. Phone (08) 8303 4455, Fax: (08) 83034364

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NSW Ms Deb Nias
Dept Land and Water Conservation, PO Box 380, Dareton NSW 2717
ph: 03-50274303, fax: 03-50274769; email: dnias@dlwc.nsw.gov.au

Qld Dr Gary Jones
CSIRO Land & Water, Sciences Centre, 80 Meiers Rd., Indooroopilly, Qld 4068
Ph: 07-3896-9516 Fax: 07-3896-9525
Email: gary.jones@dnr.qld.gov.au

SA Ms Kerri Muller
Botany Dept, University of Adelaide, SA 5005
Ph: 08-8303 4560 Fax: 08-8232 3297
Email: kmuller@botany.adelaide.edu.au

WA Dr Jenny Davis
School of Environmental Sciences, Murdoch University, Murdoch WA 6150
Ph: 08-9360 2939 Fax: 08-9310 4997
Email: davis@essun1.murdoch.edu.au

ACT Dr Ralph Ogden
Dept. of Applied Science, University of Canberra, PO Box 1, Belconnen ACT 2616
Ph: 02-6201 2033
Email: ogden@science.canberra.edu.au

NT Ms Ruth O'Connor
School of Biological Sciences, Northern Territory University, Darwin NT 0909
Ph 08-8946 6761 Fax 08-8946 6847
Email: r_oconnor@banks.ntu.edu.au

VIC Ms Rhonda Butcher
Dept. Ecology & Evolutionary Biology, Monash University, Clayton, VIC 3168
Ph: 03- 9905 5643 Fax: 03-9905 5613
Email: rhonda.butcher@sci.monash.edu.au

Tas Dr Jean Jackson
118 Wentworth Street, South Hobart, Tas 7004
Ph: 03-62237133 Fax: 03-62237133
Email: jeanj@ifc.tas.gov.au

EDITORIAL ADDRESS

Ivor Growns, NSW Fisheries, Private Bag 1, Nelson Bay, NSW 2315
ph (02) 4982 1232.fax (02) 4982 2265.email grownsi@fisheries.nsw.gov.au

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